

CHAPTER FOUR

RESULTS

4.0 Descriptive overview of the vowels of individual Dialects

This chapter discusses the results of the studies. In all, the vowels as produced by 44 speakers (24 males and 20 females) were measured. There were three tokens of each vowel per speaker. Values were obtained for the first two formants for the vowels [i, e, ε, ə, a, u, o ɔ] and their nasalized counterparts [ĩ, ĕ, ě, ã, ã, õ, ù, ã]. From these $F2^1$ (i.e. $F2-F1$) was calculated. The formant values of the vowels of each individual speaker were first of all plotted, $F2^1$ against $F1$ on the formant chart with $F1$ on the ordinate (vertical axis) and $F2^1$ on the abscissa (horizontal axis). For each speaker, the mean values of three tokens of each vowel (for both orals and nasals) were plotted on formant charts. The results are presented in order of dialects with reference to individual speaker differences where necessary.

Results of the one-way analysis of variance (ANOVA) within dialects and between dialects are presented. And where necessary, a paired sample test of pairs of vowels was also presented to aid explanations of vowel overlaps. Tables of formant values and ANOVA results and figures of formant plot are also presented for easy description of the acoustic characteristics of the speakers, the dialects and finally the language as a whole.

4.1 Anlo Speakers

Figure 4.1.1 shows the formant plot of the mean values of the vowels for each speaker.

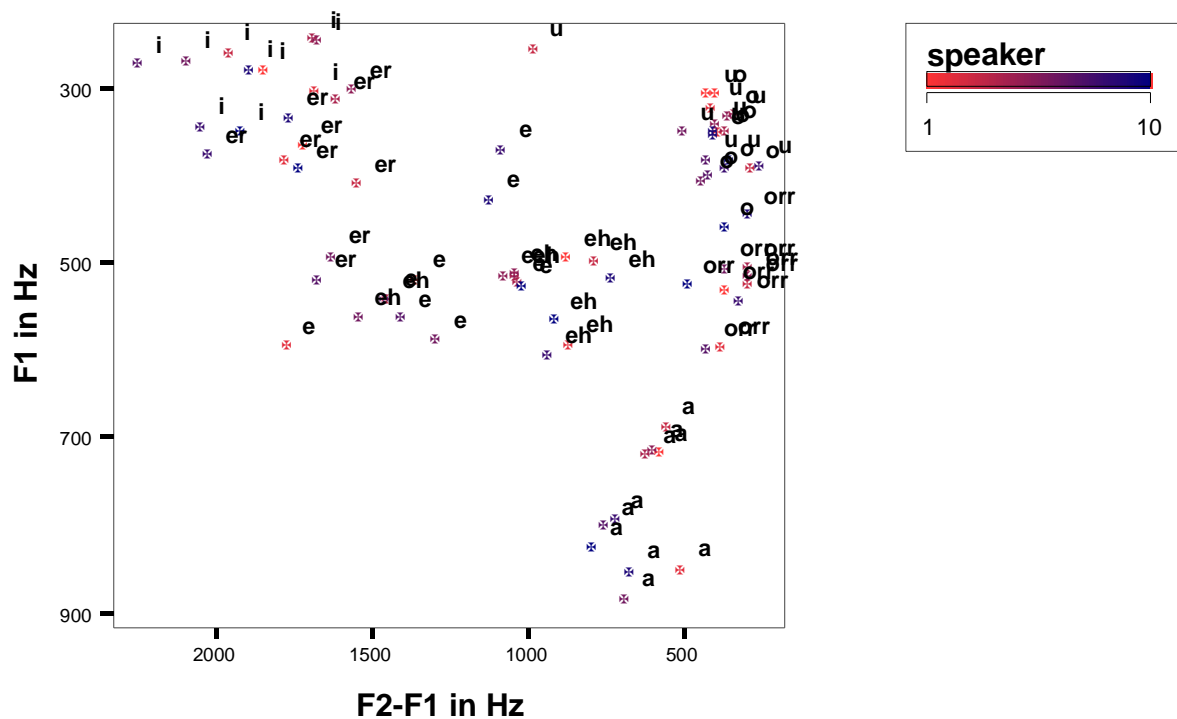


Figure 4.1.1 Formant plot of oral vowels of speakers of Anɔ dialect. er=ɛ, eh= ə and orr=ɔ

Figure 4.1.1 and 4.1.2 is the plots of average formant frequencies of vowels in the $F1/F2^1$ plane for ten speakers of Anɔ dialect. Separate plots (4.1.1 and 4.1.2) are shown for the oral and the nasalized vowels respectively. With respect to oral vowels, the front high vowel, [i] has $F1$ values ranging between 250 and 360 Hz and $F2^1$ between 1600 and 2000 Hz. Some speakers however, have it more fronted with $F2^1$ values between 2090 and 2255 Hz. The formant plot appears to show a considerable confusion between the high front and the mid front vowels [i], [e], [ɛ], and the central vowel [ə]. They are all scattered in area with $F1$ between 300 and 600 Hz and $F2^1$ ranging from 1500 to 1800 Hz for [ɛ], 1030 to 1800 Hz for [e] and [ə] substantially overlapping with [e] with $F2^1$ between 700 and 1000 Hz. One speaker unexpectedly, produced [ə] very front at $F2^1$ of 1461Hz. The vowel traditionally transcribed [a] in Ewe literature as a central vowel contrarily, occupied a back location, just a little shifted from the peripheral toward the center with $F1$ values ranging from 700 to 900 Hz and $F2^1$ between 500 and 800 Hz. The back vowels [u], [o] and [ɔ] of the Anɔ speakers are located

at their traditionally ascribed positions in the back with [u] almost clustering with [o] with F1 values falling in the region of 260 and 460 Hz and F2¹ of 260 and 500 Hz for all speakers except one speaker who had [u] located at F2¹ region of 987Hz. [ɔ] has occupied an area equidistant to [e] within the region of 450 to 600 F1 values and F2¹ ranges of 299 and 495 Hz for all speakers. Analysis of variance of these vowels however, revealed no significant effect of difference between all speakers.

The nasalized vowels appear (See figure 4.1.2), to be slightly more scattered and confusing in term of production as compared to their oral counterparts. The front vowels are located in the same F2¹/ F1 region as the oral ones. The back vowels [ũ] and [õ] however, are more shifted from the back toward the center as compared to their oral counterparts. Analysis of variance (ANOVA) results of inert-speaker differences for both the oral and the nasalized vowels were not statistically significant for all vowels. This means that the differences in the formant values are not enough to differentiate between the vowel productions of the individual speakers.

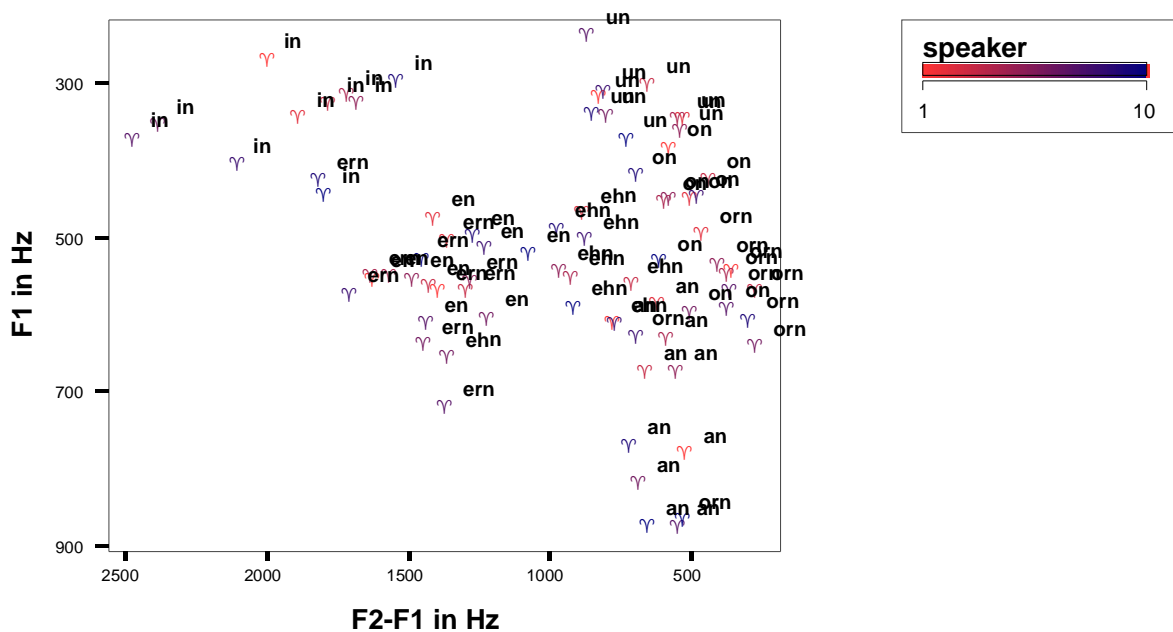


Figure 4.1.2 Formant plot of nasal vowels of speakers of Anɔ dialect. in=ĩ , en=ẽ, ern=ẽ̃, an= ã, un=ũ, on=õ and orn= õ̃.

Table 4.1.1 Paired sample T-test for main effect and interaction of the vowels [e], [ɛ], [ə], [u], [o] and their nasalized counterparts Aṇḷ dialect.

Vowel Pairs	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% confidence Interval of Difference				
				Lower	Upper			
e-ε	-77.77	374.41	68.36	-17.57	-37.96	-4.063	29	.000
e-ə	77.47	234.05	42.73	-9.93	164.86	1.813	29	.080
ε-ə	355.23	445.90	81.41	188.73	555.69	4.208	29	.000
ẽ-ε	-62.81	242.06	46.58	-258.57	-67.06	-3.495	26	.002
ẽ-ə	137.20	260.28	47.52	40.01	234.39	2.887	29	.007
ε-ə	318.44	329.25	63.36	188.20	448.69	5.026	26	.000
u-o	21.70	172.28	31.45	-42.63	86.03	.690	29	.496
ũ -õ	23.88	194.99	35.60	-48.93	96.69	.671	29	.506

The above results indicate that with the 95% confidence interval of the difference, there are significant differences between the pairs [e]-[ɛ], [ɛ]-[ə], [ẽ]-[ẽ̃], [ə]-[ã] and [ẽ]-[ã] with ($p < 0.05$) despite their overlap in the plane. This means that the Aṇḷ dialect speakers did differentiate between the productions of all the pairs above except [e]-[ə]. The result shows a vast significant effect of interaction between the production of [u] and [o] and their nasal counterparts with 95% confidence difference of $p < 0.496$ and $p < 0.506$ for the orals and nasals respectively. It is therefore obvious that the Aṇḷ speakers do not have a clear distinction in the production of these vowels.

4.2 Avenor Speakers

Figure 4.2.1 shows a scatter plot of the vowels produced by the Avenor dialect speakers.

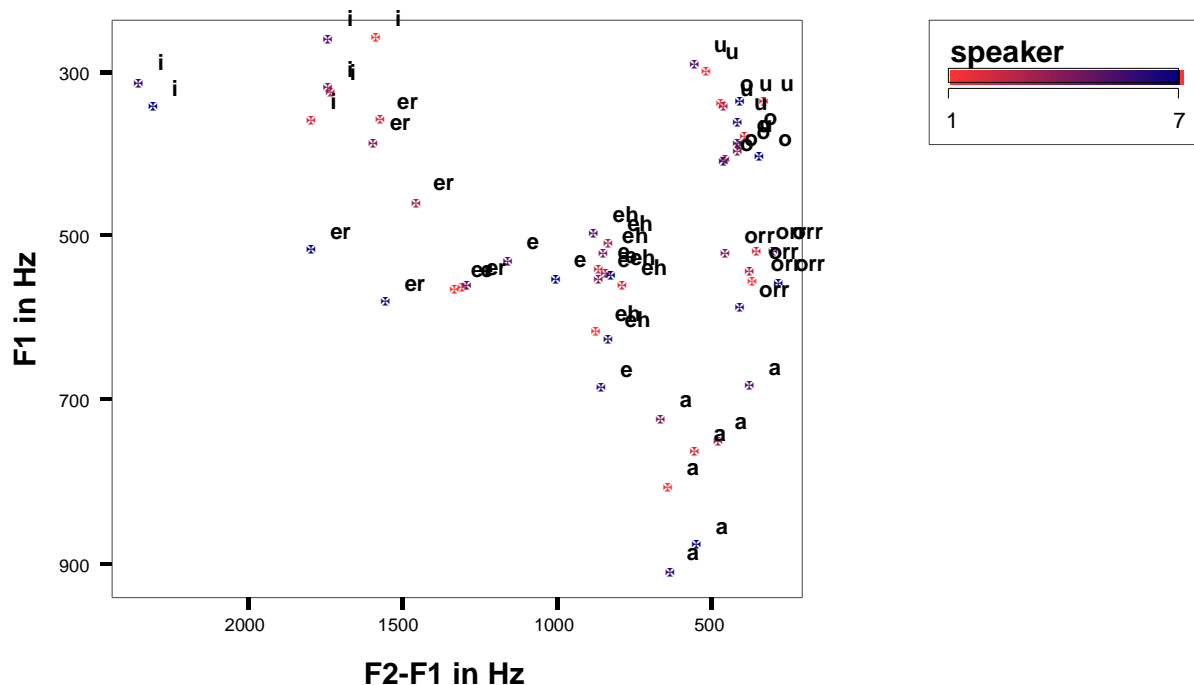


Figure 4.2.1 Formant plot of oral vowels of Avenor speakers. er=ε, eh=ə and orr=ɔ

A look at the format plots of the vowels of these speakers show similarities to the vowels of Anjo speakers with just a few variations across the vowels. All the vowels, as produced by speakers of this dialect are located almost in the same acoustic space as that of Anjo speakers. However one speaker of Avenor had [a] produced very low and open with F1 above 900 Hz. The analysis of variance within this dialect shows no significant difference between the vowel qualities across speakers.